COLLISION REPAIR TECHNOLOGY STANDARDS

This document was prepared by:

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Adopted by the State Board of Education /
State Board for Career and Technical Education on
December 12, 2013

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CTE MISSION STATEMENT:

The Office of Career, Technical and Adult Education is dedicated to developing innovative educational opportunities for students to acquire skills for productive employment and lifelong learning.

NEVADA DEPARTMENT OF EDUCATION

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ACKNOWLEDGEMENTS

The development of Nevada career and technical standards and assessments is a collaborative effort sponsored by the Office of Career, Technical and Adult Education at the Department of Education and the Career and Technical Education Consortium of States. The Department of Education relies on teachers and industry representatives who have the technical expertise and teaching experience to develop standards and performance indicators that truly measure student skill attainment. Most important, however, is recognition of the time, expertise and great diligence provided by the writing team members in developing the career and technical standards for Collision Repair Technology.

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BUSINESS AND INDUSTRY VALIDATION

All CTE standards developed through the Nevada Department of Education are validated by business and industry through one or more of the following processes: (1) the standards are developed by a team consisting of business and industry representatives; or (2) a separate review panel was coordinated with industry experts to ensure the standards include the proper content; or (3) the adoption of nationally-recognized standards endorsed by business and industry.

The Collision Repair Technology standards were validated with the adoption of the nationally recognized standards approved by the NATEF (National Automotive Technicians Education Foundation).

PROJECT COORDINATOR

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INTRODUCTION

The standards in this document are designed to clearly state what the student should know and be able to do upon completion of an advanced high school Collision Repair Technology program. These standards are designed for a three-credit course sequence that prepares the student for a technical assessment directly aligned to the standards.

These exit-level standards are designed for the student to complete all standards through their completion of a program of study. These standards are intended to guide curriculum objectives for a program of study.

The standards are organized as follows:

Content Standards are general statements that identify major areas of knowledge, understanding, and the skills students are expected to learn in key subject and career areas by the end of the program.

Performance Standards follow each content standard. Performance standards identify the more specific components of each content standard and define the expected abilities of students within each content standard.

Performance Indicators are very specific criteria statements for determining whether a student meets the performance standard. Performance indicators may also be used as learning outcomes, which teachers can identify as they plan their program learning objectives.

The crosswalk and alignment section of the document shows where the performance indicators support the English Language Arts and the Mathematics Common Core State Standards, and the Nevada State Science Standards. Where correlation with an academic standard exists, students in the Collision Repair Technology program perform learning activities that support, either directly or indirectly, achievement of one or more Common Core State Standards.

All students are encouraged to participate in the career and technical student organization (CTSO) that relates to their program area. CTSOs are co-curricular national associations that directly enforce learning in the CTE classroom through curriculum resources, competitive events, and leadership development. CTSOs provide students the ability to apply academic and technical knowledge, develop communication and teamwork skills, and cultivate leadership skills to ensure college and career readiness.

The Employability Skills for Career Readiness identify the “soft skills” needed to be successful in all careers, and must be taught as an integrated component of all CTE course sequences. These standards are available in a separate document.

The **Standards Reference Code** is only used to identify or align performance indicators listed in the standards to daily lesson plans, curriculum documents, or national standards.

Program Name	Standards Reference Code
Collision Repair Technology	CRT

Example: CRT.2.3.4

Standards	Content Standard	Performance Standard	Performance Indicator
Collision Repair Technology	2	3	4

CONTENT STANDARD 1.0 : IDENTIFY AND UTILIZE SAFETY PROCEDURES AND PROPER TOOLS

PERFORMANCE STANDARD 1.1 : DEMONSTRATE GENERAL LAB SAFETY RULES AND PROCEDURES

1.1.1	Describe general shop safety rules and procedures (i.e., safety test)
1.1.2	Utilize safe procedures for handling of tools and equipment
1.1.3	Identify and use proper placement of floor jacks and jack stands
1.1.4	Identify and use proper procedures for safe vehicle lift operation
1.1.5	Utilize proper ventilation procedures for working within the lab/shop area
1.1.6	Identify marked safety areas
1.1.7	Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment
1.1.8	Identify the location and use of eye wash stations
1.1.9	Identify the location of the posted evacuation routes
1.1.10	Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities
1.1.11	Identify and wear appropriate clothing for lab/shop activities
1.1.12	Secure hair and jewelry for lab/shop activities
1.1.13	Research safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits
1.1.14	Research safety aspects of high voltage circuits (such as high intensity discharge [HID] lamps, ignition systems, injection systems, etc.)
1.1.15	Locate and interpret safety data sheets (MSDS, SDS)

PERFORMANCE STANDARD 1.2 : IDENTIFY AND UTILIZE PROPER TOOLS

1.2.1	Identify tools and their usage in automotive applications
1.2.2	Identify standard and metric designation
1.2.3	Demonstrate safe handling and use of appropriate tools
1.2.4	Demonstrate proper cleaning, storage, and maintenance of tools and equipment
1.2.5	Demonstrate proper use of precision measuring tools (i.e., micrometer, dial-indicator, dial-caliper)

CONTENT STANDARD 2.0 : INVESTIGATE TRANSPORTATION SYSTEMS	
PERFORMANCE STANDARD 2.1 : ASSESS TRANSPORTATION SYSTEMS	
2.1.1	Describe the history of the transportation systems and the effects on society and the economy
2.1.2	Research the different career opportunities in the transportation career path
2.1.3	Investigate new and emerging technologies
2.1.4	Analyze workplace situations and use problem-solving techniques to improve the workplace environment

CONTENT STANDARD 3.0 : DEMONSTRATE DAMAGE ANALYSIS, ESTIMATING AND CUSTOMER SERVICE SKILLS

PERFORMANCE STANDARD 3.1 : IDENTIFY VEHICLE CONSTRUCTION AND PARTS

3.1.1	Identify type of vehicle construction (space frame, unibody, body-over-frame)
3.1.2	Recognize the different damage characteristics of space frame, unibody, and body-over-frame vehicles
3.1.3	Identify impact energy absorbing components
3.1.4	Identify steel types; determine repairability
3.1.5	Identify aluminum/magnesium components; determine repairability
3.1.6	Identify plastic/composite components; determine repairability
3.1.7	Identify vehicle glass components and repair/replacement procedures
3.1.8	Identify add-on accessories

PERFORMANCE STANDARD 3.2 : PERFORM DAMAGE ANALYSIS

3.2.1	Position the vehicle for inspection
3.2.2	Prepare vehicle for inspection by providing access to damaged areas
3.2.3	Analyze damage to determine appropriate methods for overall repairs
3.2.4	Determine the direction, point(s) of impact, and extent of direct, indirect, and inertia damage
3.2.5	Gather details of the incident/accident necessary to determine the full extent of vehicle damage
3.2.6	Identify and record pre-existing damage
3.2.7	Identify and record prior repairs
3.2.8	Perform visual inspection of structural components and members
3.2.9	Identify structural damage using measuring tools and equipment
3.2.10	Perform visual inspection of non-structural components and members
3.2.11	Determine parts, components, material type(s) and procedures necessary for a proper repair
3.2.12	Identify type and condition of finish; determine if refinishing is required
3.2.13	Identify suspension, electrical, and mechanical component physical damage
3.2.14	Identify safety systems physical damage
3.2.15	Identify interior component damage
3.2.16	Identify damage to add-on accessories and modifications
3.2.17	Identify single (onetime) use components

PERFORMANCE STANDARD 3.3 : DEMONSTRATE ESTIMATING PROCEDURES	
3.3.1	Determine and record customer/vehicle owner information
3.3.2	Identify and record vehicle identification number (VIN) information, including nation of origin, make, model, restraint system, body type, production date, engine type, and assembly plant
3.3.3	Identify and record vehicle options, including trim level, paint code, transmission, accessories, and modifications
3.3.4	Identify safety systems; determine replacement items
3.3.5	Apply appropriate estimating and parts nomenclature (terminology)
3.3.6	Determine and apply appropriate estimating sequence
3.3.7	Utilize estimating guide procedure pages
3.3.8	Apply estimating guide footnotes and headnotes as needed
3.3.9	Estimate labor value for operations requiring judgment
3.3.10	Select appropriate labor value for each operation (structural, non-structural, mechanical, and refinish)
3.3.11	Select and price OEM parts; verify availability, compatibility, and condition
3.3.12	Select and price alternative/optional OEM parts; verify availability, compatibility and condition
3.3.13	Select and price aftermarket parts; verify availability, compatibility, and condition
3.3.14	Select and price recyclable/used parts; verify availability, compatibility and condition
3.3.15	Select and price remanufactured, rebuilt, and reconditioned parts; verify availability, compatibility and condition
3.3.16	Determine price and source of necessary sublet operations
3.3.17	Determine labor value, prices, charges, allowances, or fees for non-included operations and miscellaneous items
3.3.18	Recognize and apply overlap deductions, included operations, and additions
3.3.19	Determine additional material and charges
3.3.20	Determine refinishing material and charges
3.3.21	Apply math skills to establish charges and totals
3.3.22	Interpret computer-assisted and manually written estimates; verify the information is current
3.3.23	Identify procedural differences between computer-assisted systems and manually written estimates
3.3.24	Identify procedures to restore corrosion protection; establish labor values, and material charges
3.3.25	Determine the cost effectiveness of the repair and determine the approximate vehicle retail, and repair value
3.3.26	Recognize the differences in estimation procedures when using different information provider systems
3.3.27	Verify accuracy of estimate compared to the actual repair and replacement operations

PERFORMANCE STANDARD 3.4 : DEMONSTRATE CUSTOMER RELATIONS AND SALES SKILLS	
3.4.1	Acknowledge and/or greet customer/client
3.4.2	Listen to customer/client; collect information and identify customers/client's concerns, needs and expectations
3.4.3	Establish cooperative attitude with customer/client
3.4.4	Identify yourself to customer/client; offer assistance
3.4.5	Deal with angry customer/client
3.4.6	Identify customer/client preferred communication method; follow up to keep customer/client informed about parts and the repair process
3.4.7	Recognize basic claims handling procedures; explain to customer/client
3.4.8	Project positive attitude and professional appearance
3.4.9	Provide and review warranty information
3.4.10	Provide and review technical and consumer protection information
3.4.11	Estimate and explain duration of out-of-service time
3.4.12	Apply negotiation skills to obtain a mutual agreement
3.4.13	Interpret and explain manual or computer-assisted estimate to customer/client

CONTENT STANDARD 4.0 : PERFORM NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS)	
PERFORMANCE STANDARD 4.1 : DEMONSTRATE INSPECTION AND PREPARATION TECHNIQUES	
4.1.1	Review damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan
4.1.2	Inspect, remove, label, store, and reinstall exterior trim and moldings
4.1.3	Inspect, remove, label, store, and reinstall interior trim and components
4.1.4	Inspect, remove, label, store, and reinstall body panels and components that may interfere with or be damaged during repair
4.1.5	Inspect, remove, label, store, and reinstall vehicle mechanical and electrical components that may interfere with or be damaged during repair
4.1.6	Protect panels, glass, interior parts, and other vehicles adjacent to the repair area
4.1.7	Soap and water wash entire vehicle; complete pre-repair inspection checklist
4.1.8	Prepare damaged area using water-based and solvent-based cleaners
4.1.9	Remove corrosion protection, undercoatings, sealers, and other protective coatings as necessary to perform repairs
4.1.10	Inspect, remove, and reinstall repairable plastics and other components for off-vehicle repair
4.1.11	Inspect, remove, and replace seatbelt and shoulder harness assembly and components
4.1.12	Inspect restraint system mounting areas for damage; repair as needed
4.1.13	Verify proper operation of seatbelt
PERFORMANCE STANDARD 4.2 : PERFORM OUTER BODY PANEL REPAIRS, REPLACEMENTS, AND ADJUSTMENTS	
4.2.1	Determine the extent of direct and indirect/hidden damage and direction of impact; develop and document a repair plan
4.2.2	Inspect, remove, replace, and align hood, hood hinges, and hood latch
4.2.3	Inspect, remove, replace, and align deck lid, lid hinges, and lid latch
4.2.4	Inspect, remove, replace, and align doors, latches, hinges, and related hardware
4.2.5	Inspect, remove, replace and align tailgates, hatches, liftgates and sliding doors
4.2.6	Inspect, remove, replace, and align bumper bars, covers, reinforcement, guards, isolators, and mounting hardware
4.2.7	Inspect, remove, replace and align fenders, and related panels
4.2.8	Straighten contours of damaged panels to a suitable condition for body filling or metal finishing using power tools, hand tools, and weld-on pulling attachments
4.2.9	Weld damaged or torn steel body panels; repair broken welds
4.2.10	Restore corrosion protection
4.2.11	Restore sound deadeners and foam materials
4.2.12	Perform panel bonding and weld bonding
4.2.13	Diagnose and repair water leaks, dust leaks, and wind noise
4.2.14	Identify one-time use fasteners
4.2.15	Clean, inspect, and prepare reusable fasteners

PERFORMANCE STANDARD 4.3 : APPLY METAL FINISHING AND BODY FILLING TECHNIQUES	
4.3.1	Remove paint from the damaged area of a body panel
4.3.2	Locate and repair surface irregularities on a damaged body panel
4.3.3	Demonstrate hammer and dolly techniques
4.3.4	Heat shrink stretched panel areas to proper contour
4.3.5	Cold shrink stretched panel areas to proper contour
4.3.6	Prepare and apply body filler
4.3.7	Identify different types of body fillers
4.3.8	Rough sand body filler to contour; finish sand
PERFORMANCE STANDARD 4.4 : INSPECT MOVEABLE GLASS AND HARDWARE COMPONENTS	
4.4.1	Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanisms, and related controls
4.4.2	Inspect, adjust, repair, remove, reinstall or replace weather-stripping
4.4.3	Initialize electrical components as needed
PERFORMANCE STANDARD 4.5 : PERFORM METAL WELDING AND CUTTING TECHNIQUES	
4.5.1	Identify weldable and non-weldable substrates used in vehicle construction
4.5.2	Weld and cut high-strength steel and other steels
4.5.3	Determine the correct GMAW (MIG) welder type, electrode/wire type, diameter, and gas to be used in a specific welding situation
4.5.4	Set up and adjust the GMAW (MIG) welder to "tune" for proper electrode stickout, voltage, polarity, flow rate, and wire-feed speed required for the substrate being welded
4.5.5	Store, handle, and install high-pressure gas cylinders
4.5.6	Determine work clamp (ground) location and attach
4.5.7	Use the proper angle of the gun to the joint and direction of gun travel for the type of weld being made in the flat, horizontal, vertical, and overhead positions
4.5.8	Protect adjacent panels, glass, vehicle interior, etc., from welding and cutting operations
4.5.9	Protect computers and other electronic control modules during welding procedures
4.5.10	Clean and prepare the metal to be welded, assure good metal fit-up, apply weld-through primer if necessary, clamp or tack as required
4.5.11	Determine the joint type (butt weld with backing, lap, etc.) for weld being made
4.5.12	Determine the type of weld (continuous, stitch weld, plug, etc.) for each specific welding operation
4.5.13	Perform the following welds: continuous, plug, butt weld with and without backing, fillet, etc.
4.5.14	Perform visual and destructive tests on each weld type
4.5.15	Identify the causes of various welding defects; make necessary adjustments
4.5.16	Identify cause of contact tip burn-back and failure of wire to feed; make necessary adjustments
4.5.17	Identify cutting process for different substrates and locations
4.5.18	Identify different methods of attaching non-structural components (squeeze type resistant spot welds (STRSW), riveting, non-structural adhesive, silicon bronze, etc.)

PERFORMANCE STANDARD 4.6 : UTILIZE PLASTICS AND ADHESIVES	
4.6.1	Identify the types of plastics; determine repairability
4.6.2	Clean and prepare the surface of plastic parts; identify the types of plastic repair procedures
4.6.3	Repair rigid, semi-rigid, or flexible plastic panels
4.6.4	Remove or repair damaged areas from rigid exterior composite panels
4.6.5	Replace bonded rigid exterior composite body panels; straighten or align panel supports
4.6.6	Demonstrate the proper cleanup procedures for specific adhesives

CONTENT STANDARD 5.0 : PERFORM STRUCTURAL ANALYSIS AND DAMAGE REPAIR	
PERFORMANCE STANDARD 5.1 : DEMONSTRATE INSPECTION AND REPAIR TECHNIQUES	
5.1.1	Measure and diagnose structural damage using a tram gauge
5.1.2	Attach vehicle to anchoring devices
5.1.3	Determine the extent of the direct and indirect damage and the direction of impact; document the methods and sequence of repair
5.1.4	Analyze and identify crush/collapse zones
5.1.5	Restore mounting and anchoring locations
5.1.6	Check for water leaks, dust leaks, and wind noise
5.1.7	Perform visual inspection and measuring checks to identify steering and suspension collision damage
5.1.8	Reinstall wheels and torque lug nuts

CONTENT STANDARD 6.0 : DEMONSTRATE PAINTING AND REFINISHING TECHNIQUES

PERFORMANCE STANDARD 6.1 : APPLY SAFETY PRECAUTIONS

6.1.1	Identify and take necessary precautions with hazardous operations and materials according to federal, state, and local regulations
6.1.2	Identify safety and personal health hazards according to OSHA guidelines and the "Right to Know Law"
6.1.3	Inspect spray environment and equipment to ensure compliance with federal, state and local regulations, and for safety and cleanliness hazards
6.1.4	Select and use a NIOSH approved air purifying respirator. Inspect condition and ensure fit and operation. Perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation
6.1.5	Select and use a NIOSH approved supplied air (fresh air make-up) respirator system. Perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation
6.1.6	Select and use the proper personal safety equipment for surface preparation, spray gun and related equipment operation, paint mixing, matching and application, paint defects, and detailing (gloves, suits, hoods, eye and ear protection, etc.)

PERFORMANCE STANDARD 6.2 : UTILIZE SURFACE PREPARATION TECHNIQUES

6.2.1	Inspect, remove, store, and replace exterior trim and components necessary for proper surface preparation
6.2.2	Soap and water wash entire vehicle; use appropriate cleaner to remove contaminants
6.2.3	Inspect and identify type of finish, surface condition, and film thickness; develop and document a plan for refinishing using a total product system
6.2.4	Strip paint to bare substrate (paint removal)
6.2.5	Dry or wet sand areas to be refinished
6.2.6	Featheredge areas to be refinished
6.2.7	Apply suitable metal treatment or primer in accordance with total product systems
6.2.8	Mask and protect other areas that will not be refinished
6.2.9	Mix primer, primer-surfacer or primer-sealer
6.2.10	Identify a complementary color or shade of undercoat to improve coverage
6.2.11	Apply primer onto surface of repaired area
6.2.12	Apply two-component finishing filler to minor surface imperfections
6.2.13	Block sand area to which primer-surfacer has been applied
6.2.14	Dry sand area to which finishing filler has been applied
6.2.15	Remove dust from area to be refinished, including cracks or moldings of adjacent areas
6.2.16	Clean area to be refinished using a final cleaning solution
6.2.17	Remove, with a tack rag, any dust or lint particles from the area to be refinished
6.2.18	Apply suitable sealer to the area being refinished
6.2.19	Scuff sand to remove nibs or imperfections from a sealer
6.2.20	Apply stone chip resistant coating
6.2.21	Restore caulking and seam sealers to repaired areas

6.2.22	Prepare adjacent panels for blending
6.2.23	Identify the types of rigid, semi-rigid or flexible plastic parts to be refinished; determine the materials needed, preparation, and refinishing procedures
6.2.24	Identify metal parts to be refinished; determine the materials needed, preparation, and refinishing procedures
PERFORMANCE STANDARD 6.3 : PERFORM SPRAY GUN AND RELATED EQUIPMENT OPERATIONS	
6.3.1	Inspect, clean, and determine condition of spray guns and related equipment (air hoses, regulators, air lines, air source, and spray environment)
6.3.2	Select spray gun and setup (fluid needle, nozzle, and cap) for product being applied
6.3.3	Test and adjust spray gun using fluid, air and pattern control valves
6.3.4	Demonstrate an understanding of the operation of pressure spray equipment
PERFORMANCE STANDARD 6.4 : UTILIZE PAINT MIXING, MATCHING, AND APPLICATION TECHNIQUES	
6.4.1	Identify color code by manufacturer's vehicle information label
6.4.2	Shake, stir, reduce, catalyze/activate, and strain refinish materials
6.4.3	Apply finish using appropriate spray techniques (gun arc, angle, distance, travel speed, and spray pattern overlap) for the finish being applied
6.4.4	Apply selected product on test or let-down panel; check for color match
6.4.5	Apply single stage topcoat
6.4.6	Apply basecoat/clearcoat for panel blending and panel refinishing
6.4.7	Apply basecoat/clearcoat for overall refinishing
6.4.8	Remove nibs or imperfections from basecoat
6.4.9	Refinish rigid or semi-rigid plastic parts
6.4.10	Refinish flexible plastic parts
6.4.11	Apply multi-stage coats for panel blending and overall refinishing
6.4.12	Identify and mix paint using a formula
6.4.13	Identify poor hiding colors; determine necessary action
6.4.14	Tint color using formula to achieve a blendable match
6.4.15	Identify alternative color formula to achieve a blendable match
6.4.16	Identify the materials equipment, and preparation differences between solvent and waterborne technologies
PERFORMANCE STANDARD 6.5 : IDENTIFY PAINT DEFECTS – CAUSES AND CURES	
6.5.1	Identify blistering (raising of the paint surface, air entrapment); determine the cause(s) and correct the condition
6.5.2	Identify a dry spray appearance in the paint surface; determine the cause(s) and correct the condition
6.5.3	Identify the presence of fish-eyes (crater-like openings) in the finish; determine the cause(s) and correct the condition
6.5.4	Identify lifting; determine the cause(s) and correct the condition
6.5.5	Identify clouding (mottling and streaking in metallic finishes); determine the cause(s) and correct the condition
6.5.6	Identify orange peel; determine the cause(s) and correct the condition
6.5.7	Identify overspray; determine the cause(s) and correct the condition

6.5.8	Identify solvent popping in freshly painted surface; determine the cause(s) and correct the condition
6.5.9	Identify sags and runs in paint surface; determine the cause(s) and correct the condition
6.5.10	Identify sanding marks or sandscratch swelling; determine the cause(s) and correct the condition
6.5.11	Identify contour mapping/edge mapping while finish is drying; determine the cause(s) and correct the condition
6.5.12	Identify color difference (off-shade); determine the cause(s) and correct the condition
6.5.13	Identify tape tracking; determine the cause(s) and correct the condition
6.5.14	Identify low gloss condition; determine the cause(s) and correct the condition
6.5.15	Identify poor adhesion; determine the cause(s) and correct the condition
6.5.16	Identify paint cracking (shrinking, splitting, crowsfeet or line-checking, micro-checking, etc.); determine the cause(s) and correct the condition
6.5.17	Identify corrosion; determine the cause(s) and correct the condition
6.5.18	Identify dirt or dust in the paint surface; determine the cause(s) and correct the condition
6.5.19	Identify water spotting; determine the cause(s) and correct the condition
6.5.20	Identify finish damage caused by bird droppings, tree sap, and other natural causes; correct the condition
6.5.21	Identify finish damage caused by airborne contaminants (acids, soot, rail dust, and other industrial-related causes); correct the condition
6.5.22	Identify die-back conditions (dulling of the paint film showing haziness); determine the cause(s) and correct the condition
6.5.23	Identify chalking (oxidation); determine the cause(s) and correct the condition
6.5.24	Identify bleed-through (staining); determine the cause(s) and correct the condition
6.5.25	Identify pin-holing; determine the cause(s) and correct the condition
6.5.26	Identify buffing-related imperfections (swirl marks, wheel burns); correct the condition
6.5.27	Identify pigment flotation (color change through film build); determine the cause(s) and correct the condition
PERFORMANCE STANDARD 6.6 : PERFORM FINAL DETAIL PROCEDURES	
6.6.1	Apply decals, transfers, tapes, woodgrains, pinstripes (painted and taped), etc.
6.6.2	Sand, buff and polish fresh or existing finish to remove defects as required
6.6.3	Clean interior, exterior, and glass
6.6.4	Clean body openings (door jambs and edges, etc.)
6.6.5	Remove overspray
6.6.6	Perform vehicle clean-up; complete quality control using a checklist

CROSSWALKS AND ALIGNMENTS OF COLLISION REPAIR TECHNOLOGY STANDARDS AND THE COMMON CORE STATE STANDARDS, THE NEVADA SCIENCE STANDARDS, AND THE COMMON CAREER TECHNICAL CORE STANDARDS

CROSSWALKS (ACADEMIC STANDARDS)

The crosswalk of the Collision Repair Technology Standards shows links to the Common Core State Standards for English Language Arts and Mathematics and the Nevada Science Standards. The crosswalk identifies the performance indicators in which the learning objectives in the Collision Repair Technology program support academic learning. The performance indicators are grouped according to their content standard and are crosswalked to the English Language Arts and Mathematics Common Core State Standards and the Nevada Science Standards.

ALIGNMENTS (MATHEMATICAL PRACTICES)

In addition to correlation with the Common Core Mathematics Content Standards, many performance indicators support the Common Core Mathematical Practices. The following table illustrates the alignment of the Collision Repair Technology Standards Performance Indicators and the Common Core Mathematical Practices. This alignment identifies the performance indicators in which the learning objectives in the Collision Repair Technology program support academic learning.

CROSSWALKS (COMMON CAREER TECHNICAL CORE)

The crosswalk of the Collision Repair Technology Standards shows links to the Common Career Technical Core. The crosswalk identifies the performance indicators in which the learning objectives in the Collision Repair Technology program support the Common Career Technical Core. The Common Career Technical Core defines what students should know and be able to do after completing instruction in a program of study. The Collision Repair Technology Standards are crosswalked to the Transportation, Distribution & Logistics Career Cluster™ and the Facility & Mobile Equipment Maintenance Career Pathway.

CROSSWALK OF COLLISION REPAIR TECHNOLOGY STANDARDS AND THE COMMON CORE STATE STANDARDS

CONTENT STANDARD 1.0: IDENTIFY AND UTILIZE SAFETY PROCEDURES AND PROPER TOOLS

Performance Indicators	Common Core State Standards and Nevada Science Standards
1.1.1	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
1.1.4	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
1.1.7	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
1.1.13	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.

1.1.14	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
1.1.15	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. RST.11-12.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.9 Draw evidence from informational texts to support analysis, reflection, and research.

CONTENT STANDARD 2.0: INVESTIGATE TRANSPORTATION SYSTEMS

Performance Indicators	Common Core State Standards and Nevada Science Standards
2.1.1	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
2.1.2	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
2.1.3	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.

CONTENT STANDARD 3.0: DEMONSTRATE DAMAGE ANALYSIS, ESTIMATING AND CUSTOMER SERVICE SKILLS

Performance Indicators	Common Core State Standards and Nevada Science Standards
3.2.3	**English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
3.2.5	**English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
3.3.2	**English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
3.3.3	**English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
3.3.5	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
3.3.6	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
3.3.7	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
3.3.8	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
3.3.22	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
3.4.2	**English Language Arts: Speaking and Listening Standards** SL.11-12.1c Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.

3.4.5	**English Language Arts: Speaking and Listening Standards** SL.11-12.1c Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.
3.4.6	**English Language Arts: Speaking and Listening Standards** SL.11-12.1d Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.
3.4.7	**English Language Arts: Speaking and Listening Standards** SL.11-12.1d Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.
3.4.9	**English Language Arts: Speaking and Listening Standards** SL.11-12.1d Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.
3.4.10	**English Language Arts: Speaking and Listening Standards** SL.11-12.1d Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.
3.4.12	**English Language Arts: Speaking and Listening Standards** SL.11-12.1c Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.
3.4.13	**English Language Arts: Speaking and Listening Standards** SL.11-12.1d Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.

CONTENT STANDARD 4.0: PERFORM NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS)

Performance Indicators	Common Core State Standards and Nevada Science Standards
4.1.1	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
4.2.1	**English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
4.6.6	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

CONTENT STANDARD 5.0: PERFORM STRUCTURAL ANALYSIS AND DAMAGE REPAIR

Performance Indicators	Common Core State Standards and Nevada Science Standards
5.1.3	**English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CONTENT STANDARD 6.0: DEMONSTRATE PAINTING AND REFINISHING TECHNIQUES

Performance Indicators	Common Core State Standards and Nevada Science Standards
6.1.1	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
6.1.2	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
6.1.3	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
6.1.4	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
6.1.5	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
6.1.6	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
6.2.3	**English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
6.2.7	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
6.2.9	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

ALIGNMENT OF COLLISION REPAIR TECHNOLOGY STANDARDS AND THE COMMON CORE MATHEMATICAL PRACTICES

Common Core Mathematical Practices	Collision Repair Technology Performance Indicators
1. Make sense of problems and persevere in solving them.	
2. Reason abstractly and quantitatively.	
3. Construct viable arguments and critique the reasoning of others.	
4. Model with mathematics.	
5. Use appropriate tools strategically.	1.2.2, 1.2.3, 1.2.5 3.2.9; 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.3.13, 3.3.14, 3.3.15, 3.3.16, 3.3.17, 3.3.18, 3.3.19, 3.3.20, 3.3.21, 3.3.22, 3.3.23, 3.3.24, 3.3.25, 3.3.26, 3.3.27; 3.4.11 5.1.1, 5.1.7 6.2.7, 6.2.9; 6.4.2, 6.4.12
6. Attend to precision.	1.2.2, 1.2.3, 1.2.5 3.2.9; 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.3.13, 3.3.14, 3.3.15, 3.3.16, 3.3.17, 3.3.18, 3.3.19, 3.3.20, 3.3.21, 3.3.22, 3.3.23, 3.3.24, 3.3.25, 3.3.26, 3.3.27; 3.4.11 5.1.1, 5.1.7 6.2.7, 6.2.9; 6.4.2, 6.4.12
7. Look for and make use of structure.	
8. Look for and express regularity in repeated reasoning.	

CROSSWALKS OF COLLISION REPAIR TECHNOLOGY STANDARDS AND THE COMMON CAREER TECHNICAL CORE

Transportation, Distribution & Logistics Career Cluster™ (TD)	Performance Indicators
1. Describe the nature and scope of the Transportation, Distribution & Logistics Career Cluster™ and the role of transportation, distribution and logistics in society and the economy.	2.1.1
2. Describe the application and use of new and emerging advanced techniques to provide solutions for transportation, distribution and logistics problems.	2.1.3
3. Describe the key operational activities required of successful transportation, distribution and logistics facilities.	2.1.4
4. Identify governmental policies and procedures for transportation, distribution and logistics facilities.	2.1.4
5. Describe transportation, distribution and logistics employee rights and responsibilities and employers' obligations concerning occupational safety and health.	1.1.1, 1.1.15; 2.1.4 6.1.1, 6.1.2, 6.1.3, 6.1.4 6.1.5, 6.1.6
6. Describe career opportunities and means to achieve those opportunities in each of the Transportation, Distribution & Logistics Career Pathways.	2.1.2

Facility & Mobile Equipment Maintenance Career Pathway (TD-MTN)	Performance Indicators
1. Develop preventative maintenance plans and systems to keep facility and mobile equipment inventory in operation.	1.2.4; 2.1.4
2. Design ways to improve facility and equipment system performance.	2.1.4